

What is claimed is:

1. A liquid-jet head having a passage-forming substrate in which pressure generating chambers communicating with nozzle orifices are formed; and a piezoelectric element provided on one surface of said passage-forming substrate via a vibration plate, said piezoelectric element composed of a lower electrode, a piezoelectric layer, and an upper electrode, the liquid-jet head comprising:

a zirconium oxide layer formed on the one surface of said passage-forming substrate;

a cerium oxide layer formed on said zirconium oxide layer;

a superconductor layer formed on said cerium oxide layer and composed of a yttrium-barium-copper-oxygen-based material (YBCO);

said lower electrode formed on said superconductor layer and composed of strontium ruthenate; and

said piezoelectric layer formed on said lower electrode.

2. The liquid-jet head according to claim 1, wherein crystal plane orientation of said lower electrode is (100)-orientation, and crystal plane orientation of said piezoelectric layer is (100)-orientation.

3. The liquid-jet head according to claim 2, wherein a longitudinal direction of said pressure generating chamber is identical with, or at 45° to, (100)-direction included in the crystal plane orientation (100) of said piezoelectric layer.
4. The liquid-jet head according to claim 1, wherein said piezoelectric layer is composed of crystals which are rhombohedral crystals.
5. The liquid-jet head according to claim 1, wherein said piezoelectric layer is composed of lead zirconate titanate (PZT).
6. The liquid-jet head according to claim 1, wherein said piezoelectric layer is an epitaxially grown single crystal PZT thin film.
7. The liquid-jet head according to claim 1, wherein said passage-forming substrate is a single crystal silicon substrate having a crystal plane orientation (100).
8. The liquid-jet head according to claim 7, wherein said pressure generating chamber is formed in said single crystal silicon substrate by dry etching, and each layer

of said piezoelectric element is formed by a deposition
and lithography method.

9. Aliquid-jet apparatus comprising the liquid-jet
head according to any one of claims 1 to 8.